

## UMBRELLA FRAME AND OPERATING SYSTEM

### BACKGROUND OF THE INVENTION

#### Claim of Priority

This is a continuation-in-part patent application of a U.S. patent application filed on June 11, 1999 for an Umbrella Frame, Serial No. 09/330,600, which is set to mature into U.S. Patent No. 6,314,976 on November 13, 2001, and of a related U.S. patent application, namely, Serial No. 09/433,881 filed on November 4, 1999 for an Umbrella Operating System, both of which are incorporated by reference fully herein.

#### Field of the Invention

This invention relates generally to umbrellas, and more particularly to a durable and versatile umbrella frame designed to more readily endure abusive weather conditions. The present invention also relates more particularly to an umbrella operating system having improved stabilization qualities and customization features.

#### DESCRIPTION OF THE RELATED ART

Outdoor umbrellas are employed to shield people from the sun, wind, rain, and other elements of nature. As such, they are intentionally designed to withstand these elements. Nevertheless, damage to the framework of an umbrella can and

1 does occur for many reasons, particularly to umbrellas in  
2 geographical areas of severe and unexpected weather, as well as  
3 umbrellas which have been improperly installed. Many prior art  
4 umbrellas suffer the disadvantages of not being able to  
5 withstand gusts of wind and other harsh weather as well as not  
6 being capable of simple repair when damage does occur. For  
7 example, an umbrella having static wire, rigid line and an  
8 unbalanced construction at the rib and strut pivot point will  
9 wear and often break when extreme forces are applied over time.  
10 Once an umbrella is damaged, it is often more expensive, time  
11 consuming and difficult to repair the umbrella than to just have  
12 it replaced.

13 For umbrellas having individual pivotal connections between  
14 the upper rib and lower strut assembly, the unbalanced nature of  
15 the movement at the pivot point in relation to the upper and  
16 lower central hubs causes unnecessary wear on the pivot junction  
17 as well as to the static wire or rigid line which connects the  
18 canopy rib assembly to the central hubs. This wear is  
19 undesirable and is aggravated over time by the stresses of both  
20 man and nature.

21 For umbrellas having individual pivotal connections between  
22 the upper rib and lower strut assembly by means of a vertically  
23 configured bracket individually, the existing brackets protrude  
24 over the top of the canopy assembly providing a point of  
25 friction between the fabric of the canopy and the rigid

1       protrusion of the pivot bracket. This creates excessive wear on  
2       a fabric canopy and often creates holes in the fabric canopy.

3               Various umbrella frames are described, for example, in the  
4       following U.S. Patent Nos.: D25,368 to Sparry; D56,043 to  
5       Weinberg et al.; 2,336,116 to Morando; 3,177,882 to Militano;  
6       4,368,749 to Lindler et al.; 4,834,126 to Sweet, Jr.; and  
7       5,715,853 to Lin. None of these umbrella frames show the  
8       structure of the invention recited subsequently herein nor the  
9       benefits or advantages thereby.

10              In addition to the foregoing, many have tried to simplify  
11       and improve the operational features of the umbrella as well as  
12       to add structural stability to the typical umbrella. However,  
13       many such efforts have required the use of a crank to open and  
14       close the umbrella or require placing one's hand in a  
15       compromising position in order to lock and unlock the umbrella  
16       from its open position. Such action is often troublesome and  
17       inconvenient, and can result in injury.

18              Accordingly, there remains a need in the art for an  
19       umbrella which is structured to withstand high winds and other  
20       abusive weather, which in addition, may be quickly, easily and  
21       inexpensively repaired when that becomes necessary. If any such  
22       umbrella were developed, it would preferably also be easily  
23       modified to accommodate umbrella canopies of different sizes and  
24       shapes. Further, if any such umbrella were developed it would  
25       preferably include an operating system for allowing the umbrella

1 to be easily opened, rotated, and adjusted to various vertical  
2 positions and then simply locked in place. Finally, if any such  
3 umbrella were developed it would preferably also include a  
4 stabilizing system for improving support of the umbrella and  
5 providing a safer, more effective way to lock and unlock the  
6 umbrella in its fully extended position.

7

8 SUMMARY OF THE INVENTION

9         The present invention is designed to address these and  
10 other needs which remain in the art and relates primarily to a  
11 durable outdoor umbrella frame that will withstand gusts of wind  
12 and other harsh weather and that may be quickly, easily, and  
13 inexpensively repaired. In addition, the present invention is  
14 also easily modified to accommodate umbrella canopies of  
15 different sizes and shapes. Accordingly, and as explained more  
16 in detail subsequently herein, the present invention includes a  
17 pair of hub members mounted to an umbrella pole member wherein  
18 one hub member is slidable between the top and bottom ends of  
19 the umbrella pole member. In addition, the hub members are  
20 easily mounted on the umbrella pole member, preferably so as to  
21 both be rotatable about the pole, and assist in the smooth  
22 operation of the umbrella frame. The hub members can be easily  
23 removed from the umbrella pole member for repair and/or can be  
24 easily replaced, if necessary. Further, the hub members include  
25 a plurality of slots about their radial edges for receiving a

1 combination of hub connector joints. A matching number of ribs  
2 and struts are pivotally secured to each hub by these joints,  
3 and the struts are pivotally secured to the ribs by collar  
4 members. The hub connector joints and the collar members are  
5 easily mounted and replaced, and also assist in the smooth  
6 operation of the umbrella frame. Additionally, the collar  
7 members maintain a low profile so as to avoid contacting and  
8 thereby potentially damaging a mounted canopy.

9         The present invention also provides a versatile umbrella  
10 operating system which allows an umbrella to be safely and  
11 easily opened to almost any degree, easily rotated, and securely  
12 stabilized. As such, the present invention includes an  
13 operating system to allow the umbrella to be easily adjusted to  
14 almost any degree of openness and simply locked in place. In a  
15 preferred embodiment, the operating system comprises but is not  
16 necessarily limited to a pulley system connecting or  
17 interconnected with the hub members and structured to move the  
18 one hub member up and down a length of the pole towards the  
19 other hub member, preferably disposed at the top of the pole.  
20 The operating system may include a stabilizer arm to achieve the  
21 opening and/or closing of the umbrella and/or to bolster support  
22 to the umbrella and provide a safer, more effective way to lock  
23 and unlock the umbrella in its fully extended position. In  
24 addition, a base plate member having a flip lid attachment may  
25 be employed to provide stability at the bottom end of the

1       umbrella, as well as to provide a means to keep the umbrella  
2       base opening covered when the umbrella is removed.

3           One primary object of the present invention is to provide  
4       an umbrella frame capable of withstanding both hot and cold  
5       temperatures, high wind conditions and other harsh weather.

6           It is another object of the present invention to provide an  
7       umbrella frame which can be easily manipulated to allow the  
8       attachment of canopies of varying shapes and sizes.

9           It is a further object of the present invention to provide  
10      an umbrella frame capable of simple rotation, such as about a  
11      pole member or otherwise.

12          It is another object of the present invention to provide an  
13       umbrella frame having easily replaceable and interchangeable  
14       parts.

15          Another important object of the present invention is to  
16       provide an umbrella assembly capable of being opened to any  
17       desired vertical position.

18          Yet another object of the present invention is to provide  
19       an umbrella assembly capable of being opened to any desired  
20       vertical position while at the same time being rotatable.

21          Still another object of the present invention is to provide  
22       an umbrella assembly which eliminates the need for and/or does  
23       not have to rely upon a crank lift to open and close the  
24       umbrella assembly.

25          It is yet another object of the present invention to

1 provide an umbrella assembly which eliminates the need for  
2 and/or which does not have to rely upon a security pin beneath  
3 the lower movable hub member to retain the umbrella in a desired  
4 vertical position.

5 The foregoing list of objects for the invention is meant to  
6 be illustrative only and should not be considered to be limiting  
7 in any sense. As such, these and other objects, features and  
8 advantages of the present invention will become more clear  
9 and/or may be gleaned from the detailed description of the  
10 invention in various preferred embodiment(s), set forth below.

11

12 BRIEF DESCRIPTION OF THE DRAWINGS

13 Figure 1 is a partial exploded front elevational view in  
14 partial cross-section of an umbrella frame assembly of the  
15 present invention in an embodiment utilizing a retaining pin,  
16 with the umbrella closed position shown in phantom.

17 Figure 2 is an exploded perspective view of a preferred  
18 main hub member and a secondary hub member according to the  
19 present invention and also illustrating preferred hub connector  
20 joints.

21 Figure 3 is an exploded perspective view of a preferred  
22 collar member of the present invention.

23 Figures 4 through 8 are top schematic views showing  
24 examples of different canopy shapes which may be employed with  
25 the present invention.

1           Figure 9 is a partial front elevational view in partial  
2 cross-section of the umbrella frame assembly similar to that  
3 shown in Figure 1, but in an embodiment utilizing a double  
4 pulley system.

5           Figure 10 is a partial front elevational view of another  
6 embodiment of the umbrella operating system of the present  
7 invention, shown with stabilizer arm and support assembly and  
8 with the open position of the umbrella shown in phantom.

9           Figure 11 is a partial front elevational view of the  
10 present invention, similar to that shown in Figure 10, but shown  
11 with a stabilizer arm and a pulley system.

12           Figure 12 is an exploded perspective view of the support  
13 assembly which may be included within the umbrella operating  
14 system of the present invention.

15           Figure 13 is a partial side elevational view of one  
16 embodiment of a pulley system of the umbrella operating system  
17 of the present invention.

18           Figure 14 is a partial side elevational view of another  
19 embodiment of a pulley system which may be utilized with the  
20 umbrella operating system of the present invention.

21           Figure 15 is a partial side elevational view of one  
22 embodiment of the pulley system of the umbrella operating system  
23 of the present invention.

24           Figure 16 is a partial side elevational view of another  
25 embodiment of the pulley system of the umbrella operating system

1 of the present invention.

2

3 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

4 As shown throughout the various Figures, the present  
5 invention relates to an improved umbrella frame and operating  
6 assembly.

7 With initial reference to Figures 1 through 8, an improved  
8 umbrella frame assembly, generally indicated by reference  
9 numeral 10, according to the present invention will now be  
10 described. The umbrella frame assembly 10 is intended for use  
11 in easily and quickly supporting a variety of shapes and sizes  
12 of umbrella canopies, and is structured to be both durable and  
13 weather resistant. As illustrated in these Figures, the frame  
14 assembly 10 includes a longitudinally extending pole member 12  
15 which can be made of wood, aluminum or other material. In one  
16 embodiment, the pole member 12 is made of 40 gauge aluminum.  
17 The pole member 12 has a top end 14 and a bottom end 16. The  
18 bottom end 16 may be easily secured to the ground or any means  
19 of vertical affixment, such as but not limited to a reinforced  
20 concrete base, which for example, might have a star knob and  
21 hitch pin. The bottom end 16 of the pole member 12 might also  
22 be connected to a suitable sturdy base having one or more wheels  
23 incorporated therein so as to render the overall umbrella and  
24 frame movable between various locations.

25 The umbrella frame assembly 10 also comprises a pair of hub

members. As best shown in Figures 1 and 2, preferably the assembly includes a main hub member 18, having a central cavity 20 extending axially therethrough, which is secured about the pole member 12 and is slidable between the top end 14 and bottom end 16 of the pole member 12. The main hub member 18 is also capable of rotating about a longitudinal axis of the pole member 12. In one embodiment of the invention, as shown in the Figures, the main hub member 18 is provided with a substantially "hour glass" shaped base portion 22 having an upper portion 24 and a lower portion 26 and a waist portion 28 which is of smaller diameter than the upper portion 24 and lower portion 26. The shape of the base portion 22 is more comfortably structured to allow for simple hand manipulation of the hub member 18 up and down the pole member 12.

As shown throughout the Figures, an upper or secondary hub member 30 is provided near the top end 14 of the pole member 12. The secondary hub member 30 is provided with a central cavity 32 extending axially therethrough, wherein the cavity includes a pole receiving portion 34 and a narrower upper portion 36 which extends through an interior wall 38 of the secondary hub member 30, or simply an aperture formed therein. The interior wall 38 maintains the secondary hub member 30 in position at the top end 14 of the pole member 12. The hub members 18, 30 may be made of injecting molded thermoplastic, such as DELRIN with TEFLON, for example, so as to resist rust, UV degradation, dry rot, and

1 water damage. Other rigid and/or flexible materials may be  
2 used.

3 As illustrated in Figure 1, in the preferred embodiment of  
4 the present invention, a threaded bolt 15 extends from the top  
5 end 14 of the pole member 12 through the narrow upper portion 36  
6 of the secondary hub member central cavity 32 such that the  
7 secondary hub member 30 is hangably secured to the pole member  
8 12 near its top end 14. While the secondary hub member 30 may  
9 be freely rotated about the bolt 15 and the pole member 12 near  
10 its top end 14, a nut 17 may be tightened about the bolt 15  
11 which is capable of restricting the movement of and/or of  
12 maintaining the secondary hub member 30 in substantially rigid  
13 position about the pole member 12. When desired, the nut 17 may  
14 be loosened so as to allow the secondary hub member 30 to freely  
15 rotate about the longitudinal axis of the pole member 12. A  
16 finial or end cap 40 is preferably also secured to the bolt 15  
17 for aesthetic purposes once a canopy 21 has been positioned atop  
18 the umbrella frame assembly 10. The end cap 40 also maintains  
19 the canopy 21 in a secured central position.

20 In an alternate embodiment not shown in the Figures, the  
21 secondary hub member 30 may be structured to include a rigid  
22 bolt member which extends axially downward through the pole  
23 receiving portion 34 of the central cavity 32. In this  
24 embodiment, at least the top end 14 of the pole member 12  
25 comprises a partially hollow interior sufficiently sized to

receive the rigid bolt member of the secondary hub member 30. Positioning the downwardly extending rigid bolt member of the secondary hub member 30 into the at least partially hollow interior of the top end 14 of the pole member 12 and the pole receiving portion 34 over the exterior of the top end 14, also provides the capability for the secondary hub member 30 to rotate about the longitudinal axis of the pole member 12.

As shown in Figure 2, the main hub member 18 and secondary hub member 30 are preferably further provided with slots 42 formed at intervals about their respective radial edges 44. The slots 42 are ideally three sided and include a base 46, a back wall 48, and a pair of side walls 50. The back wall 48 faces radially outwardly from the hub members 18, 30 and the pair of side walls 50 extend outwardly from the back wall 48 at diverging angles. In one embodiment of the invention, the slots 42 are approximately 1/4 inch in depth and the back wall 48 is approximately 3/4 inches in width.

As is also shown in Figure 2, the umbrella frame assembly 10 of the present invention preferably comprises hub connector joints 52 that are insertable within the hub member slots 42 and which may be secured therein by screws 54, for example. The hub connector joints 52 may be made of injection molded thermoplastic or stamped metal, for example. The hub connector joints 52 are provided with a base portion 56 and a pair of substantially parallel side walls 58 which define a hub

1 connector joint aperture 60. The hub connector joints 52 also  
2 have a back face 62 and a pair of corner walls 64 which extend  
3 outwardly from the back face 62 at diverging angles. The back  
4 face 62 and the pair of corner walls 64 mate respectively with  
5 the back wall 48 and pair of side walls 50. Thus, the angles  
6 with which the corner walls 64 and pair of side walls 50 diverge  
7 from the back face 62 and the back wall 48, respectively, are  
8 substantially identical. In one embodiment of the invention,  
9 this angle is approximately 104 degrees. Providing the slots 42  
10 with three walls 48, 50 and a base portion 46 ensures a snug fit  
11 of the hub connector joints 52 within the hub member slots 42  
12 and helps prevent the hub connector joints 52 from twisting or  
13 displacing under stress. Further, the depth and width of the  
14 slots 42 allow the hub connector joints 52 to be readily secured  
15 and removed from within the slots using a screw 54, as shown in  
16 Figure 2. While a screw member 54 is shown as the means of  
17 attachment for the hub connector joints 52 within the hub member  
18 slots 42, other forms of attachment may be employed, such as a  
19 machine threaded bolt, fitted notch or other element which  
20 allows the hub connector joints 52 to be easily attached and  
21 removed. As shown in Figure 2, the interior surface 66 of the  
22 hub connector joints 52 may be rounded and substantially U-  
23 shaped so as to provide clearance for rib and strut members, as  
24 described hereinafter. In the embodiment of the invention as  
25 shown in Figure 2, the hub members 18, 30 are each provided with

1       eight slots 42 so as to accommodate up to eight hub connector  
2       joints 52. Other numbers of slots may be utilized as well.

3                  As shown in Figures 1 and 3, the umbrella frame assembly 10  
4       of the present invention preferably also comprises rib members  
5       70, which may be pivotally secured to the hub connector joints  
6       52 of the secondary hub member 30. The rib members 70 form the  
7       outer framework of the improved umbrella frame assembly 10 of  
8       the present invention. Strut members 80 are pivotally secured  
9       at an inner end 82 to the hub connector joints 52 of the main  
10      hub member 18 and are pivotally secured at an outer end 84 to  
11      the rib members 70 at a point near the approximate midpoint of  
12      the rib members 70. The strut members 80 provide support for  
13      the rib members 70 when the umbrella frame assembly 10 is in the  
14      extended or open position, thereby collectively providing a  
15      means for supporting the umbrella canopy 21. Pivotal attachment  
16      of the rib members 70 and the strut members 80 to their  
17      respective hub connector joints 52 may be exacted using a single  
18      screw 54 extending through the hub connector joint 52 and rib  
19      member 70 or strut member 80, however, a machine threaded bolt,  
20      a fitted notch or other like joinery that allows the hub  
21      connector joints 52 to be easily replaceable may be utilized.  
22      The rib members 70 and strut members 80 may be made of a variety  
23      of materials such as, by way of example only, aluminum or wood.

24                  As shown in Figure 3, the strut members 80 are pivotally  
25      secured to the rib members 70 by a collar member 90. The collar

1 member 90 includes a pair of substantially parallel outer walls  
2 92 and a central divider wall 94 which combine to define an  
3 upper channel portion 96 and a lower slot portion 98 on opposite  
4 sides of the divider wall 94. The upper portion 100 of the  
5 collar member outer walls 92 which define the channel portion 96  
6 includes outwardly diverging side edges 102 and a substantially  
7 flat top edge 104. The channel portion 96 may have a  
8 substantially rounded channel portion interior surface 106  
9 adapted for receiving the rib members 70. When the rib members  
10 are in a substantially different shape, the channel portion  
11 96 may be adapted to match that shape. As shown in Figure 3,  
12 the channel portion interior surface 106 extends around over one  
13 half the circumference of the rib member 70. Also, as shown in  
14 Figure 3, the rib members 70 may be secured within the collar  
15 member channel portion 96 by a screw 91 and nut 93. The  
16 substantially flat top edge 104 of the collar member 90 avoids  
17 contact with the umbrella canopy 21 which is positioned over the  
18 rib members 70 and thereby helps prolong the life of the canopy  
19 employed. The strut members 80 are pivotally secured to the  
20 slot portion 98 of the collar member 90 by a screw 91 and nut  
21 93, as shown in Figure 3. Also, as shown in Figure 3, a  
22 substantially cylindrical sleeve member 110 may be employed  
23 between the collar member 90 and the rib member 70 to reinforce  
24 the support provided by the strut member 80 to the rib member  
25 70. In one embodiment of the invention, the sleeve member 110

1       is made of aluminum.

2                  As discussed more fully later herein with reference to  
3       Figures 9 through 16, although the main hub member 18 is movably  
4       and axially attached to the pole member 12 through central  
5       cavity 20 and, therefore, free to both rotate and slide about  
6       it, the main hub member 18 may be maintained in a vertical  
7       position along the length of the pole member 12 in several ways.  
8       For example, and as shown in Figure 1, one way utilizes a  
9       retaining pin 112 attached to the main hub member 18 which can  
10      be placed within a retaining pin slot 114 in the pole member 12  
11      in order to maintain the vertical position of the main hub  
12      member 18 along the pole member 12. As shown in Figure 1, the  
13      retaining pin 112 can be maintained around the waist portion 28  
14      of the main hub member by a looped line 116 which allows the  
15      main hub member 18 to rotate without binding the looped line  
16      116. Thus, the retaining pin 112 is secured to the main hub  
17      member 18 in such a manner so as to allow the free rotation of  
18      the hub members 18, 30 about the longitudinal axis of the pole  
19      member 12 even while the pin 112 is in place within the pin  
20      retaining slot 114, thereby maintaining the vertical position of  
21      the main hub member 18 along the pole member 12. The main hub  
22      member 18 may also be formed of two pieces and may employ ball  
23      or roller bearings or the like to allow the two pieces to move  
24      independently of one another in a lateral direction, while still  
25      moving as a single unit up and down the pole member 12. Such an

1 arrangement allows the retaining pin 112 to remain within its  
2 slot 114 and thereby maintain the main hub member 18 in the  
3 upper, frame extended, vertical position while allowing the  
4 remaining components of the umbrella frame assembly 10 to be  
5 freely rotated about the longitudinal axis of the pole member  
6 12.

7 In operation, any desired number and size of rib members 70  
8 and strut members 80 may be employed, depending on the  
9 particular size and shape of the umbrella canopy to be attached.  
10 Because the hub connector joints 52 and collar member 90 are so  
11 easily installed, many different configurations of the canopy  
12 can be achieved with little effort by either increasing or  
13 decreasing the number of hub connector joints 52 present on the  
14 hub members 18, 30. For example, as shown in Figures 4 through  
15 8, four rib members 70 are employed for the square shaped canopy  
16 122 (Figure 4), eight rib members 70 are employed for the  
17 octagonal shaped canopy 124 (Figure 5), three rib members 70 are  
18 employed for the triangular shaped canopy 126 (Figure 6), six  
19 rib members 70 are employed for the rectangular shaped canopy  
20 128 (Figure 7) and five rib members 70 are employed for the  
21 semi-octagonal shaped canopy 130 (Figure 8). The number of rib  
22 members 70 to be employed determines the number of strut members  
23 80, hub connector joints 52, and collar members 90 to be  
24 employed. For example, with four rib members 70, four strut  
25 members 80, eight hub connector joints 52, and four collar

members 90 are employed. For proper operation, the hub connector joints 52 must be secured within corresponding slots 42 in the main hub member 18 and the secondary hub member 30. Other geometrical shapes and sizes of canopies may also be employed using the frame assembly of the present invention.

Canopies of varying shapes and sizes are attached to the umbrella frame by unscrewing the finial or end cap 40 from the top end 14 of the pole member 12 and removing the securing nut 17. The canopy opening is placed over the threaded bolt 15 and the canopy cuffs are placed around the outer ends of the rib members 70. The securing nut 17 and end cap 40 are then placed back onto the threaded bolt 15. In one embodiment of the invention, the canopy members are SUNBRELLA 100% solution-dyed acrylic canopies or any other shade-like or non-shade like material.

When the frame is in the retracted position, as shown in phantom in Figures 1, 9, and 11, the main hub member 18 is near the bottom end 16 of the pole member 12. As the main hub member 18 is lifted up the pole member 12, the strut members 80 extend outwardly, thereby expanding the rib members 70 and opening the attached canopy 21. As the strut members 80 pass the point where they extend perpendicularly from the pole member 12, the strut members 80 lock into place against a hub stop member 120 secured to the pole member 12, as shown in solid lines in Figure 1. The retaining pin 112, described above, can then be placed

1       within the pin retaining slot 114 formed on the pole member 12,  
2       and the hub member 18 may then be returned downwardly to rest  
3       against the pin 112. In this position, as shown in the dashed  
4       lines in Figure 1, the strut members 80 extend in a  
5       substantially perpendicular fashion from the pole member 12 to  
6       provide substantial support to the rib members 70.

7       The hub connector joints 52 and the collar members 90 are  
8       also considered to be important inventive steps forward which  
9       significantly improve the structural and long term integrity of  
10      the improved umbrella frame assembly 10. First, the upper  
11      portion 100 of the collar member walls 92 remain below the  
12      height of the rib members 70; thus, the collar members 90 avoid  
13      contacting the canopy 21 during operation of the umbrella frame  
14      assembly 10. Such contact could significantly damage the fabric  
15      of the canopy 21. Secondly, the collar members 90 and the hub  
16      connector joints 52 help maintain the rib members 70 and the  
17      strut members 80 in perfect alignment so that the two  
18      independent hubs 18, 30 act in concert throughout the continual  
19      opening and closing of the umbrella frame assembly 10. The  
20      upper channel portions 96 of the collar members 90 cradle the  
21      rib members 70 and the slot portions 98 of the collar members 90  
22      as well as the hub connector joint apertures 60 straddle their  
23      respective ends of the rib members 70 and strut members 80 and  
24      allow ease of pivotal motion. Due to the interchangeable and  
25      easily replaceable nature of the hub connector joints 52 and

1       collar members 90, a broken umbrella frame assembly 10 may be  
2       repaired quickly, easily and with minimal cost to the consumer.  
3       Different textures and colors of the hub members 18, 30, the hub  
4       connector joints 52, and the collar members 90 are also  
5       available.

6                 The umbrella frame assembly 10 may also be easily rotated  
7       about the longitudinal axis of the pole member 12 by loosening  
8       the end cap 40 and securing nut 17 from the pole member top end  
9       14 and rotating the hub members 18, 30 to their desired  
10      location. The umbrella frame assembly 10 may also employ a  
11      pulley system, described more in detail below, such as that  
12      shown in Figure 9 at reference numeral 130, to allow the user to  
13      pull the pulley cord 132 to initiate the raising of the main hub  
14      member 18 and thereby the opening the umbrella frame assembly  
15      10.

16                 With reference now to Figures 9 through 16, the improved  
17      operating system for the umbrella frame assembly, generally  
18      indicated by reference numeral 10', of the present invention  
19      will now be described, which is advantageously used in  
20      stabilizing an umbrella and in easily and quickly opening,  
21      closing and rotating an umbrella. As mentioned previously  
22      herein, the main hub member 18 may be maintained in a vertical  
23      position along the pole member 12 in several ways. As an  
24      example, Figure 9 illustrates the invention utilizing the  
25      retaining pin 112 attached to the main hub member 18 which can

1       be placed within the retaining pin slot 114 in the pole member  
2       12 in order to maintain the vertical position of the main hub  
3       member 18 along the pole member 12, while permitting the  
4       rotation of the main hub member 18 about the longitudinal axis  
5       of the pole member 12. Alternatively, the means for maintaining  
6       the main hub member 18 in the vertical position along the pole  
7       member 12 may include a stabilizer arm 150, as shown in Figures  
8       10 and 11, or the pulley system 130 as generally shown in  
9       Figures 9 and 11, and as shown in detail in Figures 13 through  
10      16.

11           As shown in Figures 10, the main hub member 18 may be  
12       maintained in a vertical position about the pole member 12 using  
13       a stabilizer arm 150. The stabilizer arm 150 is secured at a  
14       first end 152 to a strut member 80 by a collar member 154  
15       similar to collar member 90. The second end 155 of the  
16       stabilizer arm 150 is provided with a securing member 156 for  
17       operably coupling the second end 155 to the pole member 12. In  
18       one embodiment of the invention, securing member 156 is a set  
19       screw for insertion into a stabilizer opening 13 on the pole  
20       member 12. The securing member 156 may also be a pinchable  
21       clamp member or other component capable of simple insertion and  
22       removal from the stabilizer opening 13. The second end 155 of  
23       the stabilizer arm 150 is also provided with a locking strap  
24       member 158 which can be positioned around the pole member 12 and  
25       locked together such as by using a snap 159 for added support

1 and to ensure that securing member 156 does not unintentionally  
2 slip out of position from within the stabilizer opening 13.  
3 Using the stabilizer arm 150, the umbrella main hub member 18  
4 can be lifted and lowered without having to use a crank member  
5 or a retaining pin 112 at a location high up on the pole member  
6 12. This facilitates the overall ease of use of the umbrella in  
7 quickly opening, securing, and closing the umbrella frame  
8 assembly 10'.

9 As shown generally in Figures 9 and 11, and in detail in  
10 Figures 13 through 16, the main hub member 18 may also be moved  
11 up and down the pole member 12 using a pulley system 130. The  
12 pulley system 130 allows for an effortless lift of the main hub  
13 member 18 and eliminates the need for a crank lift or the  
14 retaining pin 112 beneath the main hub member 18. The pulley  
15 system 130 of the present invention allows the remote locking of  
16 the main hub member 18 in a vertical position along the pole  
17 member 12 while permitting the rotation of the entire umbrella  
18 frame assembly 10', including the main hub member 18 and the  
19 secondary hub member 30, and the associated rib members 70,  
20 strut members 80, pulley system 130, and umbrella canopy 21  
21 attached thereto, about the longitudinal axis of the pole member  
22 12.

23 In the embodiment of the invention as shown in Figure 14,  
24 the pulley system 130 includes a line member 132 having a first  
25 end 134 secured to a bracket member 136 which is secured to the

1 top surface 25 of the main hub member 18. The line member 132  
2 maybe a length of rope, for example. In this embodiment, a  
3 pulley member 138 is secured to the bottom surface 23 of the  
4 secondary hub member 30 and a cam cleat member 140 is secured to  
5 an exteriorly exposed surface of the base portion 22 of the main  
6 hub member 18. The pulley member 138 may be a typical pulley  
7 having a grooved wheel 180 rotatably mounted to a collar member  
8 182 wherein the collar member is movably secured to a bracket  
9 member 184. The pulley system 130 of the present invention  
10 allows the operator to open and maintain the umbrella in any  
11 desired position along the pole member 12 without any additional  
12 locks, pins, or levers by simply pulling the line 132 through  
13 the automatic locking cam cleat member 140.

14 As shown in Figure 14, the cam cleat member 140 includes a  
15 pair of cams 141 each having a toothed side edge 142, and a  
16 retaining bracket portion 144. The pair of cams 141 are  
17 pivotally mounted to the exteriorly exposed surface of the base  
18 portion 22 of the main hub member 18 and the retaining bracket  
19 144 is mounted to the pair of cams 141. In a rested position,  
20 as shown in Figure 14, the toothed side edges 142 of the pair of  
21 cams 141 face one another. In this embodiment, the line member  
22 132 extends from the bracket member 136 through the pulley  
23 member 138 and down through the pair of cams 141. A handle may  
24 be secured to the second end of the line member 132 to promote  
25 ease of operation.

1           Using the pulley system 130 when the umbrella is in its  
2 closed position with the main hub member 18 near the bottom end  
3 16 of the pole member 12, the user can pull the line member  
4 handle whereby the line member 132 will be pulled through the  
5 pulley member 138 and the toothed side edges 142. This will  
6 cause the pair of cams 141 to pivot such that the line member  
7 132 will continue to be pulled against the cam smooth outer  
8 surfaces 145. This will pull the bracket member 136 and main  
9 hub member 18 upward so as to open the umbrella. When the user  
10 stops pulling the line member 132, the cams 141 will reverse  
11 pivot and the toothed side edges 142 will engage and prohibit  
12 the movement of the line member 132 in either direction. The  
13 main hub member 18 will thereby be maintained in a vertical  
14 position along the pole member 12 while permitting rotation of  
15 the main hub member 18 and the secondary hub member 30, and the  
16 associated rib members 70, strut members 80, pulley system 130,  
17 and umbrella canopy 21 attached thereto, about the longitudinal  
18 axis of the pole member 12. In this way, the umbrella can be  
19 quickly and easily opened to and maintained at any desired  
20 position without the use of a hand crank or the retaining pin  
21 112 placed below the main hub member 18. When the umbrella is  
22 desired to be closed, the line member 132 can be pulled outside  
23 of the grip of the toothed side edges 142 and released. The  
24 retaining bracket 144 maintains the line member 132 in alignment  
25 with the toothed side edges 142 such that the user can easily

1 re-engage the line member 132 with the toothed side edges 142 so  
2 as to lock the line member 132 at the desired vertical position.  
3 Only the intentional removal of the line member 132 from the  
4 toothed side edges 142 with a deliberate sideways and upward  
5 movement will allow the umbrella to close. The toothed side  
6 edges 142 thus prevents any unintentional closing of the  
7 umbrella from wind gusts or other outside forces.

8 As shown in Figure 14, the pulley system 130 of the present  
9 invention may include a single pulley member 138 secured to the  
10 bottom surface 23 of the secondary hub member 30 and a bracket  
11 member 136 which may be secured to the top surface 25 of the  
12 main hub member 18. The pulley system 130 of the present  
13 invention may also include first and second pulley members 138  
14 secured to the secondary hub member 30, as shown in Figure 13.  
15 In this arrangement, the line member 132 extends from the  
16 bracket member 136 through a first pulley member 138 on the  
17 secondary hub member 30, through a pulley member 138 on the main  
18 hub member 18, through a second pulley member 138 on the  
19 secondary hub member 30 and down through the cam cleat member  
20 140. Such an arrangement provides a mechanical advantage in  
21 balance and lifting power to the device. In one embodiment of  
22 this arrangement, the first and second pulley members 138 of the  
23 secondary hub member 30 are spaced substantially radially  
24 equidistant from the axis of the secondary hub member 30. Other  
25 variations on the number of pulley members 138 employed on each

1 hub member 18, 30 may be used. Since the hub members 18, 30 are  
2 rotatable about the longitudinal axis of the pole member 12,  
3 when the nut 17 is loosened, and the pulley system 130 secured  
4 to the hub members 18, 30, this arrangement provides the  
5 umbrella of the present invention with the ultimate in  
6 versatility, as the umbrella may be opened, rotated, and  
7 maintained in any desired position completely free of  
8 impediments.

9 As shown in Figure 13, the line member 132 extends  
10 downwardly from the pulley member 138 so as to be substantially  
11 coplanar with a main hub member slot wall 44. This keeps the  
12 line member 132 free from contact with a hub connector joint 52  
13 which could bind and cause unnecessary wear on the line member  
14 132. Also, as shown in Figure 12, the line member 132 may be  
15 retained on a hook member 190 secured to the exteriorly exposed  
16 surface of the base portion 22 of the main hub member 18.

17 As shown in Figures 15 and 16, the secondary hub pulley  
18 members 138 may optionally be secured directly to the pole  
19 member 12 by bracket members 136 which can extend substantially  
20 perpendicularly from the pole member 12, for example. In this  
21 embodiment, the hub members 18, 30 are prohibited from freely  
22 rotating about the pole member 12 because they are  
23 interconnected to the pulley system 130, which is at least  
24 partially secured to the pole member 12 by bracket members 136.

25 As shown in Figures 10 and 12, the pole member 12 may be

1       stabilized at its bottom end 16 of the pole member 12 using a  
2       support assembly 120. The support assembly 120 includes a base  
3       126 having a plate member 124 secured thereto by a hinge member  
4       123, wherein the plate member 124 has a pin member 122 extending  
5       from its inside surface 125. The pin member 122 is receivable  
6       by an opening on the bottom end 16 of the pole member 12. The  
7       base 126 includes a substantially cylindrical tube portion 127  
8       extending from its bottom surface 128 and a base opening 131  
9       extending through the tube 127 for receiving the pole member 12.  
10      In one embodiment of the invention, the pole member 12 is  
11      provided with a pair of axial slots 133 for mating with a  
12      securing rod 135 within the tube 127. The plate member 124 is  
13      hingedly secured to the base 126 such that, when the pole member  
14      12 is removed, the plate member 124 can cover the base opening  
15      131 so as to prevent rain, trash, feet and hands, and other like  
16      elements from falling into the base opening 131. In one  
17      embodiment of the invention, the pin member 122 is a set screw.  
18      In a further embodiment of the invention the pin member 122 can  
19      be a pinchable clamp member insertable and removable from the  
20      pole opening by pinching the sides together. A strap member 129  
21      may also be attached to the plate member 124 and secured about  
22      the pole member 12 for added support. In one embodiment, as  
23      shown in Figure 12, the strap member includes a snapping lock  
24      mechanism 137.

25      The rigidity and density of all the components described

herein can be tempered for a desired flexibility as needed. For example, the pole member 12, rib members 70, and strut members 80 may be comprised of metal, wood or fiberglass but their construction would not be limited to these rigid compositions. The nature of thermoplastic construction with materials like ABS, DELRIN, POLYPROPOLYNE and other ACETALS allow for a degree of flexibility in the hubs connector joints 52, collar members 90, pulley members 138, and cam cleat members 140 of the umbrella frame. Because these plastics have a degree of flexibility, the energy that normally would be absorbed by a completely static frame umbrella is distributed through all of the plastic components of the umbrella in heavy wind conditions or other harsh weather, and thus, use of such materials is preferable as it should greatly increase the life of the static frame of an outdoor umbrella, which is generally the more costly portion of an umbrella unit.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

Since many modifications, variations and changes in detail

1 can be made to the described preferred embodiment of the  
2 invention, it is intended that all matters in the foregoing  
3 description and shown in the accompanying drawings be  
4 interpreted as illustrative and not in a limiting sense. Thus,  
5 the scope of the invention should be determined by the appended  
6 claims and their legal equivalents.

7 Now that the invention has been described,